Listing of Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously presented) Apparatus for a combined lithographic/flexographic printing process comprising:

a substrate;

a plurality of successive printing stations for printing color images on the substrate on a continuous in-line process;

one of said stations comprising a flexographic printing station for printing a liquid vehicle image on said substrate with a slurry containing an encapsulated essence using the flexographic process;

at least one of said successive printing stations being a lithographic printing station; and

an overcoating applied over the liquid vehicle image on the printed substrate at least one of said successive lithographic printing stations using the lithographic process in said continuous in-line process.

2. (Previously presented) Apparatus as in claim 1 wherein said overcoating is an aqueous overcoating.

3. (Previously presented) Apparatus as in claim 1 wherein said overcoating is an ultraviolet ink overcoating.

4. (Previously presented) Apparatus as in claim 1 wherein;

said substrate is a paper sheet; and

said apparatus includes a sheet feeder.

5. (Previously presented) Apparatus as in claim 1 wherein:

said substrate is a web; and

said apparatus includes a web feeder.

6. (Previously presented) Apparatus for a combined lithographic/ flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

one of said printing stations comprising a first offset flexographic printing station, for printing an aqueous-based vehicle image using the flexographic process to form a metallic coating on said substrate;

a suspended metallic material being included in said aqueous-based vehicle image;

a dryer disposed downstream of said first flexographic printing station in the direction of movement of said substrate with respect to said printing stations for treating said aqueous-based vehicle image; and

at least one of the successive printing stations comprising an offset lithographic printing station downstream of said dryer for printing a color image over the aqueous-based vehicle image using the offset lithographic process in said continuous in-line process.

7. (Previously presented) Apparatus as in claim 6 wherein said suspended material includes uniform-sized metal particles to form said metallic coating.

8. (Previously presented) Apparatus as in claim 6 wherein said suspended material includes nonuniform-sized metal particles to form said metallic coating.

9. (Previously presented) Apparatus as in claim 6 further including: said flexographic printing station including a plate cylinder having a flexographic plate thereon, a blanket cylinder, and an impression cylinder;

a flexographic plate image transferred from said plate cylinder to said blanket cylinder, said image being formed of said metallic coating, said impression cylinder in ink-transfer relationship with said blanket cylinder, said blanket cylinder transferring said metallic coating to said substrate for printing said flexographic plate image on said substrate; and

an anilox roller associated with said flexographic plate for supplying said aqueous-based vehicle containing said suspended metallic material to said flexographic plate.

10. (Previously presented) Apparatus for creating a combined lithographic/ flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

one of said stations comprising a first flexographic printing station for printing a first color image using the flexographic process;

one of said stations downstream of the first flexographic printing station comprising a second flexographic printing station for printing or coating the substrate using the flexographic process;

and

at least one of the successive printing stations comprising an offset lithographic printing station for printing a second color image over the first color image using the offset lithographic process in said continuous in-line process.

11. (Previously presented) Apparatus as in claim 10 further including:

said first flexographic printing station including a plate cylinder, a blanket cylinder, and an impression cylinder;

a flexographic plate on said plate cylinder;

an anilox roller associated with said flexographic plate for supplying a first color to said flexographic plate to form said first color image; and

said blanket cylinder receiving said first color image from said plate cylinder and transferring said first color image to said substrate.

12. (Previously presented) Apparatus for creating a combined lithographic/flexographic printing process comprising:

a substrate;

a plurality of successive printing stations for printing color images on the substrate in a continuous in-line process;

at least two successive ones of said printing stations being flexography stations and comprising:

(1) a supply of liquid coating;

(2) a plate cylinder associated with a blanket cylinder, said plate cylinder having a flexographic plate thereon;

(3) an anilox roller associated with said liquid supply coating and said plate cylinder for delivering said liquid coating to said flexographic plate to form an image for transfer to said blanket cylinder;

(4) an impression cylinder for receiving said liquid coating image transferred form said blanket cylinder and printing said image on said substrate, said at lest two flexography stations printing the same liquid coating image in sequence and in superimposed relationship; and

at least one offset lithographic printing station for receiving said substrate and printing over said liquid coating image.

13. (Previously presented) Apparatus as in claim 12 wherein said liquid coating image printed on said substrate is a white color ink.

14. (Previously presented) Apparatus as in claim 12 further including an air dryer associated with each of said impression cylinders on said flexography stations, said air dryer having sufficient air velocity for drying said liquid coating before the substrate is transferred to the successive printing station in said continuous in-line process.

15. (Previously presented) Apparatus for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;

one of said printing stations comprising a first flexographic printing station;

one of said printing stations comprising a first lithographic printing station;

a blanket cylinder at said first flexographic printing station;

an impression cylinder associated with said first flexographic printing station;

flexographic ink-providing means at said first flexographic printing station for applying a flexographic ink to said blanket cylinder to form an image;

a substrate for receiving said flexographic ink image transferred from said blanket cylinder;

a second lithographic printing station in said in-line process for receiving said image printed substrate and printing an additional colored ink image on said substrate on top of said flexographic ink image using offset lithography; and

a second flexographic printing station.

16. (Previously presented) Apparatus as in claim 15 further comprising:

a plate cylinder at said [at least first one of said] first flexographic station;

a flexographic plate on said plate cylinder for receiving and transferring said flexographic ink to said blanket cylinder; and

said flexographic ink-providing means including a flexographic ink supply and an anilox roller associated with said flexographic ink supply for transferring said flexographic ink to said flexographic plate.

17. (Previously presented) Apparatus for a combined lithographic/flexographic printing process for printing a multicolored image comprising:

a plurality of successive printing stations for printing color on a substrate in a continuous in-line process, said printing stations including both lithographic and flexographic printing stations;

one of said flexographic printing stations being a first flexographic printing station having:

(1) a plate cylinder and a blanket cylinder, said plate cylinder including a flexographic plate having an image thereon for transferring a flexographic color ink image to said blanket cylinder;

(2) an etched anilox roller for applying a flexographic color ink to said flexographic plate on said plate cylinder;

(3) an impression cylinder in ink-transfer relationship with said blanket cylinder for transferring said flexographic color ink image from said blanket cylinder to said substrate;

at least one of said succeeding printing stations being a lithographic printing station using offset lithography for printing additional colored ink images on top of said flexographic ink image; and

one of said flexographic printing stations being a second flexographic printing station.

18. (Previously presented) Apparatus as in claim 17 wherein said additional colored ink images are formed with lithographic inks.

19. (Previously presented) Apparatus as in claim 17 wherein said colored ink images are formed with waterless inks.

20. (Previously presented) Apparatus as in claim 17 further including an air dryer adjacent to said impression cylinder for drying the flexographic ink image transferred to said substrate before said additional colored ink images are printed thereon.

21. (Previously presented) Apparatus as in claim 17 further including halftone printing plates for printing said additional colored ink images.

22. (Previously presented) Apparatus as in claim 17 wherein said flexographic ink image and said colored ink images are printed as solid colors and/or with halftone printing plates in sequence and in registry in said successive printing stations to produce said multicolored image on said substrate.

23. (Previously presented) Apparatus as in claim 17 wherein said printing apparatus includes a sheet-fed press.

24. (Previously presented) Apparatus as in claim 17 wherein first said flexographic printing stations prints said flexographic color ink image with liquid vehicle slurry containing an encapsulated essence.

25. (Previously presented) Apparatus as in claim 17 wherein said first flexographic printing station prints said flexographic color ink image with a water-based liquid vehicle containing suspended particles.

26. (Previously presented) Apparatus as in claim 25 wherein said suspended particles are uniform in size.

27. (Previously presented) Apparatus as in claim 25 wherein said suspended particles are nonuniform in size.

28. (Previously presented) Apparatus as in claim 25 wherein said suspended particles are metallic particles.

29. (Previously presented) A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a plurality of successive lithographic/ flexographic printing stations for printing colored ink images on a substrate;

printing a flexographic ink image on said substrate at least a first flexographic printing station;

transferring said printed substrate to at least one subsequent lithographic printing station in said continuous in-line process;

printing colored ink images on top of said flexographic ink image at said subsequent lithographic printing station with an offset lithographic process; and

printing a coating on said substrate over said ink images at a second flexographic printing station.

30. (Previously presented) A method as in Claim 29 further comprising the step of drying said flexographic ink image on said substrate with an air dryer prior to printing said colored ink images thereon.

31. Canceled

32. (Previously presented) A method as in claim 29 wherein said colored ink images are with waterless colored inks.

33. (Previously presented) A method as in claim 29 wherein said colored ink images are printed with colored ink in a solvent-based liquid vehicle.

34. (Previously presented) A method as in claim 29 further including the steps of:

printing a slurry on said substrate at any of said printing stations in said continuous in-line process;

using an encapsulated essence in said slurry; and

printing said coating over said slurry to protect said essence.

35. (Previously presented) A method as in claim 34 wherein the step of printing said coating comprises printing an aqueous-based coating over said slurry.

36. (Previously presented) A method as in claim 34 wherein the step of printing said coating comprises printing an ultraviolet coating over said slurry.

37. (Previously presented) A method of combining offset lithography and flexographic printing in a continuous in-line process comprising the steps of:

providing a substrate;

applying a flexographic ink to a blanket cylinder in a pattern with a coating head at a first flexographic printing station;

transferring said pattern of flexographic ink from said blanket cylinder to the substrate;

transferring said substrate to a second flexographic printing station;

applying a pattern of flexographic ink to the substrate using the second flexographic printing station;

and

printing a waterless ink pattern over at least one of said flexographic ink patterns on said substrate using at least one subsequent offset lithographic printing station in said continuous in-line process.

38. (Previously presented) A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

printing an aqueous-based vehicle image having suspended particles therein on a substrate at a first flexographic printing station;

transferring said image printed substrate to a subsequent printing station in said continuous in-line process;

printing additional colored ink images on said printed substrate over said aqueous-based vehicle image in an offset lithographic process at said subsequent printing station in said in-line process; and

printing a coating over said colored ink images on said substrate using a flexographic process.

39. (Previously presented) A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

(1) providing a plurality of successive printing stations for printing liquid vehicle images on a substrate in said in-line continuous process;

(2) utilizing an anilox roller to transfer a liquid ink as said liquid vehicle to a flexographic plate image at least one of said printing stations;

(3) printing said liquid ink from said flexographic plate image to a substrate;

(4) transferring said printed substrate with said liquid ink image to a subsequent printing station in said in-line printing process;

(5) repeating steps (2)-(4) at subsequent printing stations in said in-line process to achieve a desired opacity ink image on said substrate; and

(6) printing an ink pattern over said flexographic ink image using an offset lithographic process.

40. (Previously presented) A method as in claim 39 further including the step of additionally printing colored ink images over said liquid ink image on said substrate at subsequent ones of said printing stations in said in-line process.

41. (Previously presented) A method as in claim 40 wherein said liquid ink is an opaque white color.

42-57 canceled

58. (Previously presented) Apparatus for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for depositing a series of images on a substrate in a continuous in-line process, said printing stations including, both lithographic and two flexographic printing stations;

a blanket cylinder at a first one of said flexographic printing stations;

a plate cylinder at said first one of said flexographic stations; and

a flexographic plate on said plate cylinder for receiving and transferring flexographic ink to said blanket cylinder;

a flexographic ink supply and an anilox roller associated with said flexographic ink supply for transferring flexographic ink to said flexographic plate and then to said blanket cylinder to form an image on one side of a substrate;

a substrate for receiving said flexographic ink image transferred from said blanket cylinder; and

at least one subsequent lithographic printing station in said in-line process for receiving said image printed substrate and printing an additional colored ink image on said substrate on top of said flexographic ink image.

59-81 canceled

82. (Previously presented) A method of combining lithography and flexographic printing in a continuous in-line process comprising the steps of:

(1) providing a plurality of successive printing stations for depositing a series of images on a substrate in said in-line continuous process;

(2) utilizing an anilox roller to transfer a liquid ink as one of said series of images to a flexographic plate image at least one of said printing stations;

(3) printing said liquid ink from said flexographic plate image to one side of said substrate;

(4) transferring said printed substrate with said liquid ink image to a subsequent printing station in said inline printing process;

(5) repeating steps (2)-(4) at subsequent printing stations in said in-line process to achieve a desired opacity ink image on the one side of said substrate; and

(6) printing an ink pattern on said substrate using an offset lithographic process.

83. (Previously presented) A method as in claim 82 further including the step of additionally printing ink images over said liquid ink image on said substrate at subsequent ones of said printing stations in said in-line process.

84. (Previously presented) A method as in claim 83 wherein said liquid ink is an opaque white color.

85.-152. canceled

153. (Previously presented) Apparatus for a combined lithographic/ flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process, the successive printing stations including:

a first flexographic printing station for printing an image on the first side of the substrate using the flexographic process;

a first lithographic printing station, subsequent in the continuous in-line process to the first lithographic printing station, for printing an image on the substrate using the lithographic process;

a second flexographic printing station, subsequent in the continuous in-line process to the first lithographic printing station, for printing an image on the substrate using the flexographic process; and

a second lithographic printing station, subsequent in the continuous in-line process to the second flexographic printing station, for printing an image on the first side of the substrate using the lithographic process.

154. (Previously presented) Apparatus for a combined lithographic/ flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process, the successive printing stations including:

a first flexographic printing station;

a first dryer, subsequent in the continuous in-line process to the first flexographic printing station;

a first lithographic printing station, subsequent in the continuous in-line process to the first dryer;

a second dryer, subsequent in the continuous in-line process to the first lithographic printing station;

a second flexographic printing station, subsequent in the continuous in-line process to the second dryer; and

a third dryer, subsequent in the continuous in-line process to the second flexographic printing station.

155. canceled

156. (Previously presented) A method for a combined lithographic/flexographic printing process, the method comprising the steps of:

providing a substrate having a first side and a second side;

printing an image on the first side of the substrate using a first lithographic printing station;

transferring the substrate from the first lithographic printing station to a first flexographic printing station;

printing an image on the first side of the substrate using the first flexographic printing station;

transferring the substrate from the first flexographic printing station to a second lithographic printing station;

printing an image on the first side of the substrate using the second lithographic printing station;

transferring the substrate from the second lithographic printing station to a second flexographic printing station;

printing an image on the first side of the substrate using the second flexographic printing station.

157. Cancelled.

158. (Previously presented) A method for a combined lithographic/ flexographic printing process, the method comprising the steps of:

providing a substrate;

printing an image on the substrate using a first lithographic printing station;

transferring the substrate from the first lithographic printing station to a first flexographic printing station;

printing an image on the substrate using the first flexographic printing station;

transferring the substrate from the first flexographic printing station to a first dryer;

drying the substrate in the first dryer;

transferring the substrate from the first dryer to a second lithographic printing station;

printing an image on the first side of the substrate using the second lithographic printing station;

transferring the substrate from the second lithographic printing station to a second dryer;

drying the substrate in the second dryer;

transferring the substrate from the second dryer to a second flexographic printing station;

printing an image on the substrate using the second flexographic printing station;

transferring the substrate from the second flexographic printing station to a third dryer; and

drying the substrate in the third dryer.

159-160 (Cancelled)

161. (Previously presented) Apparatus for providing a combined lithographic/ flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process, the successive printing stations comprising:

a first flexographic printing station for printing an image on said substrate using the flexographic process;

a first lithographic printing station, subsequent in the continuous in-line process to the first flexographic printing station, for printing an image on the substrate using the lithographic process; and

a dryer disposed between said printing stations for drying the image printed by said first flexographic printing station.

162. (Previously presented) The apparatus of Claim 161 including:

at least one further lithographic printing station, subsequent in the continuous in-line process to the first lithographic printing station, for printing images on said substrate using the lithographic process.

163. (Previously presented) The apparatus of Claim 162 including:

a dryer disposed between said first lithographic printing station and said further lithographic printing station for drying images printed on said substrate.

164. (Previously presented) The apparatus of Claim 163 including:

a second flexographic printing station, subsequent in the continuous in-line process to said further lithographic printing station for at least one of printing an image on said substrate and applying a coating on said substrate using the flexographic process.

165. (New) Apparatus for a combined lithographic/flexographic printing process, comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

one of said stations comprising a flexographic printing station capable of printing a liquid vehicle image on said substrate with a slurry containing an encapsulated essence using the flexographic process;

at least one of said successive printing stations being a lithographic printing station for using the lithographic process in said continuous in-line process ; and

means enabling the application of an overcoating over the liquid vehicle image on the printed substrate.

166 (New) Apparatus for a combined lithographic/flexographic printing process comprising:

a plurality of successive printing stations for printing color images on a substrate in a continuous in-line process;

one of said printing stations comprising a first offset flexographic printing station for flexographic printing an aqueous based vehicle image with a slurry containing an encapsulated essence;

a dryer disposed downstream of said first flexographic printing station in the direction of movement of said substrate with respect to said printing stations for treating said aqueous-based vehicle image; and

at least one of the successive printing stations comprising an offset lithographic printing station.